

INFORMATION FOR TECHNICAL REVIEW – BOILERS

Guidance for Permit Applicants

The following information will be used for the technical review of a Permit to Install application for a **boiler**. This information is in addition to the general requirements outlined in the AQD document “Information for an Administratively Complete Permit to Install Application,” Part 2 - Additional Supporting Information, Items A through F. All the information may not be needed for each application. Also, this document may not be all inclusive. Additional information beyond that identified may be necessary to complete the technical review of any individual application. In the event a determination is made that new additional information is needed for a technical review, this document will be updated.

All referenced guidance documents are available on the Air Quality Division (AQD) website at [AQD Permits to Install / New Source Review](#) or you may contact the Permit Section at 517-284-6795.

NOTE: Propane and natural gas-fired boilers with a maximum rated heat input of 100 million British Thermal Units (BTU or Btu) per hour may be eligible for a general permit. The use of a general permit provides a streamlined permitting alternative to the normal permitting procedure for processes that meet specified applicability criteria. Information for the general permit is available on the Internet at [General Permits to Install](#).

A. Process Description

Describe the following:

1. Boiler (at Maximum Rated Capacity)
 - a) Type of firing (spreader, stoker, pulverized coal, other-describe)
 - b) Type of fuel(s) (coal, Nos. 1-6 fuel oil, natural gas, landfill gases, coke oven gases, reprocessed fuel oil, waste oil, wood)
 - c) If burning coal, type (lignite, anthracite, bituminous, subbituminous)
 - d) Heat input rate in million Btu per hour (MMBtu/hr). Include the total rate and the individual rate for each fuel the boiler is capable of firing simultaneously.
 - e) Boiler efficiency (heat input versus heat output)
 - f) If burning municipal solid waste, feedwater or steam data (pounds/hour, temperature and pressure)
 - g) Fly ash re-injection system description, if applicable
2. Fuel and Ash
 - a) For fuel other than natural gas, propane or virgin fuel oil, the chemical analysis of the fuel (as received)
 - b) For solid fuel, the “ultimate” and “proximate” analyses including ash (as received)
 - c) High and low heating values (as received)
 - d) Maximum sulfur content (NOTE: wood, fuel oils and other fuels contain some sulfur)
 - e) For fuel oil, the density in pounds per gallon at 60°F
 - f) If a contract is signed for the coal or oil, describe the period and annual quantities the contract covers. If there is no signed contract, supply the information for items 2(a)–2(e) for all fuels that are being contemplated for use.
 - g) A description of the sample collection procedure for the analyses used to derive items 2(b)-2(d)
3. Burners and Firebox
 - a) Specific heat release (Btu/cubic foot/hour)
 - b) Furnace volume
 - c) Burner description (low NOx burners)
 - d) A description of how the boiler is preheated prior to main fuel introduction
4. Fuel Handling and Storage (for coal, wood or tire derived fuel-fired boilers only)
 - a) Method of fuel transport into plant (railroad, truck and/or ship)
 - b) Capacity in tons or gallons of each railroad car and/or unit train, truck, and/or ship
 - c) A description and line diagram of unloading facilities and pertinent air pollution controls
 - d) A description of air pollution controls at transfer points (bag filter, wetting down, other)
 - e) A description of the conveyors and any pertinent air pollution controls (enclosed conveyors, wind guards)
 - f) A description of stacking and reclaiming operations, including air pollution controls, heights and radius of operation, ability to lower/raise arms, and any other features
 - g) Type and amount of surfactant used to control coal pile (gallons surfactant per gallon liquid and gallons solution per ton coal)
 - h) Chemical analysis of surfactant and a Material Safety Data Sheet, if available

5. Ash Handling
 - a) A brief description and line diagram of how ash is transported from hopper to ash storage/disposal area
 - b) Method of air pollution control for displaced air at silos or other storage containers
 - c) Method of transport from silo to landfill
 - d) Method of air pollution control while ash is loaded on trucks or other transport vehicle
 - e) Amount removed by each truck or other transport vehicle
6. Emission Monitoring
 - a) Describe how continuous compliance with the emission limits will be documented. (Continuous emissions monitor, parametric monitoring)

B. Regulatory Discussion

The following state air pollution control regulations may be applicable. Please review these regulations carefully to determine if they apply to your process and summarize the results in the application. The Air Pollution Control Rules may be viewed from the [AQD website](#). Click on 'State Air Laws and Rules'.

1. State of Michigan, Department of Environment, Great Lakes, and Energy, Act 451 of 1994, Natural Resources and Environmental Protection Act, Part 55 Air Pollution Control and the following promulgated rules:
 - a) Rules 215 and 216 apply to an existing facility which has a current Renewable Operating Permit (ROP). A Permit to Install issued for the installation of new equipment or modifications to existing equipment is incorporated into an ROP pursuant to Rules 215 and 216.
 - b) Rules 1901 - 1908 apply to a major source and/or a major modification at a source which is located in a nonattainment area. A nonattainment area is one where the National Ambient Air Quality Standards (NAAQS) are not being met. These rules require compliance with the lowest achievable emission rate (LAER) and an emission reduction (offset) for each nonattainment air contaminant emitted in significant quantities as defined by Rule 119(e). However, a source may choose to "net out" of the requirements of these rules. For additional detailed information regarding "netting", refer to Chapter 5 of the document entitled "PSD Workbook: A Practical Guide to Michigan's Prevention of Significant Deterioration Regulations", May 2014. This guide is referred to as the AQD's PSD Workbook and can be found on the [Permits to Install \(PTI\) / New Source Review \(NSR\)](#) webpage. Click on 'Application Form Instructions & Guidance Documents'. Although the guidance document is regarding Michigan's PSD regulations, the netting analysis performed for nonattainment NSR is the same as that performed for PSD.
 - c) Rules 1801 – 1823 apply to a major source and/or a major modification at a source which is in an attainment area. An attainment area is one where the NAAQS are being met. These rules require compliance with Best Available Control Technology (BACT) and a demonstration that the proposed emissions will not contribute to the deterioration of air quality and will not violate any NAAQS or Prevention of Significant Deterioration (PSD) increment. Refer to the [AQD's PSD Workbook](#) for additional detailed information. However, a source may choose to "net out" of the requirements of the PSD rules. For additional detailed information regarding "netting", refer to Chapter 5 of the [AQD's PSD Workbook](#) for additional detailed information.
 - d) If the process or equipment was installed or modified after April 17, 1992, Rules 224 – 230 apply. Rule 224 requires the application of Best Available Control Technology for toxics (T-BACT) for all non-volatile organic compound (VOC) toxic air contaminants (TACs). T-BACT does not apply to emissions of VOCs. Rule 225 limits the emission impacts of TACs and requires a demonstration that the proposed emission of each TAC complies with a health-based screening level. Compliance can be demonstrated using any of three methods described in Rule 227(1) including the use of computerized dispersion modeling. Refer to "Guidelines for Conducting a Rule 224 T-BACT Analysis," "TACs-Demonstrating Compliance with Rule 225," and "Dispersion Modeling Guidance" for additional detailed information.
 - e) Rule 301 specifies a process or process equipment shall not discharge visible emissions of a density greater than the most stringent of a 6-minute average of 20% opacity, or a limit specified by an applicable federal NSPS or as a condition of a Permit to Install.
 - f) Rule 331 specifies a maximum allowable particulate emission rate for fuel burning equipment if no federal limit applies.
 - g) Part 4 Rules specify emission limitations and prohibitions for sulfur bearing compounds.
 - h) If the process or equipment was installed or modified after August 1, 1979, Rule 702 applies. This rule requires Best Available Control Technology (BACT) for new sources of VOCs. Refer to "Instructions for Conducting a BACT Analysis" for additional detailed information.

- i) Part 8 Rules specify the emission limitations and prohibitions for oxides of nitrogen (NO_x).
 - j) Rule 901 prohibits emissions of an air contaminant in quantities that cause either a) injurious effects to human health or safety, animal life, plant life of significant economic value, or property; or b) unreasonable interference with the comfortable enjoyment of life and property. Submit the following to address this rule:
 - A description of the continuous fugitive dust control program used to control dust from the plant, roads, and yard during construction and operation of the facility.
 - k) Rule 911 allows the Department to request a person to submit preventative maintenance and malfunction abatement program(s) for the process, emission control system(s), and monitoring system(s).
 - l) Rule 912 requires the process to operate in a manner consistent with good air pollution control practices for minimizing emissions during start-up and shutdown. Submit the following to address this rule:
 - A detailed description of the procedures and the methods used to ensure that the necessary temperature in the combustion zone, when burning fuels other than natural gas, propane, Nos. 1-6 fuel oil, wood or coal, is achieved and maintained during boiler start-up and shutdown and during periods when high moisture/low Btu waste is charged into the boiler. Include the type of auxiliary fuel and the maximum auxiliary fuel firing rate used for start-up. Provide all supporting assumptions, calculations, and other documentation.
2. The PSD increments (40 CFR 52.21 (c)) and the NAAQS (40 CFR 52.21(d)) apply to all sources throughout the United States, regardless of size. Compliance with these air quality standards can be demonstrated using computerized dispersion modeling. An applicant for a PSD permit is required to submit PSD increment modeling for PM₁₀, PM_{2.5}, SO₂ and NO_x, and NAAQS modeling for PM₁₀, PM_{2.5}, SO₂, NO_x, CO, Ozone, and Lead as part of the application. Modeling for sources not subject to PSD may be done by the AQD. Refer to “Dispersion Modeling Guidance” for additional detailed information.
 3. Federal Standards of Performance for New Stationary Sources (NSPS), 40 CFR Part 60:
 - a) Subpart D, Fossil-Fuel Fired Steam Generators with a heat input capacity greater than 250 MMBtu per hour.
 - b) Subpart Da, Electric Utility Steam Generating Units with a heat input capacity greater than 250 MMBtu per hour.
 - c) Subpart Db, Industrial-Commercial Institutional Steam Generating Units with a heat input capacity between 100 and 250 MMBtu per hour.
 - d) Subpart Dc, Small Industrial-Commercial Institutional Steam Generating Units with a heat input capacity between 10 and 100 MMBtu per hour.
 4. National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR Part 63, Subpart DDDDD, Industrial, Institutional and Commercial Boilers, and Process Heaters.
 5. Acid Rain Provisions of Title IV of the federal Clean Air Act, 40 CFR Part 72.

C. Control Technology Analysis

1. Describe the scrubber, fabric filter collector or electrostatic precipitator collector for particulate control. Provide all of the information requested on the information sheets for scrubbers, fabric filter collectors or electrostatic precipitators (available separately).
2. Describe any other emission control equipment for the boiler, including both the expected efficiency and the guaranteed efficiency (in percent) for each pollutant controlled.
3. Describe the material separation and fuel cleaning plans, if applicable.
4. Rule 702 BACT applies to all sources of VOCs proposed to be installed within the State of Michigan. A Rule 702 BACT analysis is very similar to a PSD top-down BACT analysis. Michigan’s air pollution control rules also define BACT as an emission limit. Rule 702 BACT should be applied on a flexible grouping of equipment – subdivisions of emission units and/or groupings of emission units – if it is logical to do so. Logical means that the principles on which the groupings (or subdivisions) are made are consistent with federal guidance and sound engineering practices. Refer to “Instructions for Conducting a BACT Analysis” for additional detailed information.
5. Best Available Control Technology for Toxics (T-BACT) means the maximum degree of emission reduction which the Department determines is reasonably achievable for each process that emits TACs considering energy, environmental and economic impacts, and other costs. T-BACT does not apply to VOCs. The analysis must be specific to the process and the TACs subject to a T-BACT review. T-BACT limits can be expressed as an emission limit, control equipment requirements, and/or work practice standards. Refer to “Guidelines for Conducting a Rule 224 T-BACT Analysis” for additional detailed information.

6. Lowest achievable emission rate (LAER) applies to a major source and/or a major modification at a source located in a nonattainment area. Please see the [Attainment Status Map](#) on the [AOD website](#) for Michigan's current attainment status. LAER is defined as the lowest emission limitation contained in any State Implementation Plan (SIP) or the lowest emission limitation achieved in practice. Such an emission limit is presumed to be LAER for that source class and category. If an applicant proposes to meet this presumptive LAER, no site-specific control technology determination will be necessary. When an applicant believes the presumptive LAER limit is not achievable, a site-specific determination is required. This determination should include consideration of raw material changes, process changes, and add-on control equipment. The cost of these changes is not considered. Raw material and process changes should be evaluated through technology transfer (i.e., the likelihood that such a change will transfer from one industry to another), based on the manufacture of similar products or use of similar raw materials or fuels. Add-on controls should be evaluated based on the physical and chemical characteristics of the pollutant-bearing exhaust stream.
7. PSD Top-down BACT applies to a major source and/or a major modification at a source of any regulated New Source Review pollutant located in an attainment area. The Clean Air Act defines BACT as "an emission limitation based on the maximum degree of reduction for each pollutant." BACT should be applied on a flexible grouping of equipment – subdivisions of emission units and/or groupings of emission units – if it is logical to do so. Logical means that the principles on which the groupings (or subdivisions) are made are consistent with federal guidance and sound engineering practices. Refer to Chapter 7 of the [AOD's PSD Workbook](#) for additional detailed information.

D. Emissions Summary and Calculations

Estimate the maximum uncontrolled and controlled emission rates of each of the following pollutants, in pounds per hour and tons per year. Provide all assumptions, calculations, stack tests, and other documentation used to derive these estimates.

1. Particulate matter as total suspended particulate
2. Particulate matter as PM₁₀ (particulate diameter less than 10 microns)
3. Particulate matter as PM_{2.5} (particulate diameter less than 2.5 microns)
4. Sulfur dioxide (SO₂)
5. Nitrogen Oxides, expressed as NO₂
6. Carbon Monoxide (CO)
7. VOC
8. Lead (Pb)
9. Mercury (if using coal)
10. TACs for all fuels except as defined in Rule 226(e) (R 336.1226(e))

E. Stack Parameters

Provide all assumptions, calculations, and other documentation used to derive the following:

1. The exhaust gas flow rate corrected to 50 percent excess air.
2. The typical percentage of excess air at which the boiler will operate, the percentage of air applied as overfire air and the percentage of air applied as underfire air.
3. The percentages of carbon dioxide, moisture, excess air, and oxygen in the exhaust gases when operating at maximum design conditions and under normal operating conditions.

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